

Serial No. 09/987,421

Docket No. MRE-0041

Amdt. Dated **June 29, 2004**

Reply to Office Action of December 31, 2003

REMARKS/ARGUMENTS

Claims 1-37 are pending in this application. By this Amendment, the drawings, abstract, specification and claims 1-29 are amended, and claims 30-37 are added. Support for the claims can be found throughout the specification, including the original claims, and the drawings. Withdrawal of the rejections in view of the above amendments and the following remarks is respectfully requested.

I. ALLOWABLE SUBJECT MATTER

The Examiner is thanked for the indication that claims 26-29 would be allowable if rewritten to overcome the rejection thereof under 35 U.S.C. §112, second paragraph, and in independent form, including all of the limitations of the base claim and any intervening claims. The subject matter of claims 26-29 has been incorporated into new claims 36 and 37.

II. INFORMALITIES

The Office Action objects to the drawings under 37 CFR 1.83(a), alleging they fail to show a plurality of transfers being moved in the x and y directions “by an x-y gantry,” conveyor width adjusting rollers, and conveyor lifting members installed on the inside of the conveyor guide frames.

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The specification has been amended to recite that the plurality of transfers move in x and y directions of an x-y gantry, instead of stating that the transfers are moved by the x-y gantry. This feature has been removed from the claims.

The claims have also been amended to remove the feature of conveyer width adjusting rollers. The claims now only refer to conveyor rollers, which are shown and identified in the drawings.

Additionally, the amendments made to claims 7 and 19 clarify that the conveyor lifting members 31c and 41c lift the printed circuit boards for a parts mounting operation, and lower the printed circuit boards upon completion, which is clearly shown by the conveyor lifting members 31c and 41c shown in Figures 4 and 6. These types of devices are very well known to those of ordinary skill in the art.

Accordingly it is respectfully submitted that the drawings meet the requirements of 37 CFR 1.83(a), and thus the rejection should be withdrawn.

The Office Action objects to the specification and claims 1-21 due to informalities. It is respectfully submitted that the amendments made to the specification and claims 1-21 are responsive to the Examiner's comments, and thus the objections should be withdrawn.

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III. REJECTION UNDER 35 U.S.C. §112, FIRST PARAGRAPH

The Office Action rejects claims 1-21 under 35 U.S.C. §112, first paragraph, for allegedly failing to comply with the enablement requirement. It is respectfully submitted that, as discussed above, the specification, including the original claims and the drawings, would enable one of ordinary skill in the art to make and use the invention as now recited in claims 1-21. Accordingly, it is respectfully requested that the rejection of claims 1-21 under 35 U.S.C. §112, first paragraph be withdrawn.

IV. REJECTION UNDER 35 U.S.C. §112, SECOND PARAGRAPH

The Office Action rejects claims 1-29 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The amendments made to claims 1-29 are responsive to the Examiner's comments. It is respectfully submitted that claims 1-29 now meet the requirements of 35 U.S.C. §112, second paragraph, and thus the rejection should be withdrawn.

V. REJECTION UNDER 35 U.S.C. §103(a)

The Office Action rejects claims 1-10 and 16-25 under 35 U.S.C. §103(a) as being unpatentable over Freeman et al., U.S. Patent No. 6,572,702 (hereinafter "Freeman"), in view of

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Doyle, U.S. Patent No. 6,032,577, and further in view of Park, U.S. Patent No. 5,517,748. The rejection is respectfully traversed.

A. Claims 1-9

Independent claim 1 recites, *inter alia*, a plurality of conveyors configured to receive the printed circuit boards from the plurality of transfers, to transport the printed circuit boards to a parts mounting work position, to discharge the printed circuit boards to another of the plurality of conveyors for transport to another parts mounting work position, and to discharge the printed circuit boards to the plurality of transfers when a parts mounting operation is complete. Freeman neither discloses nor suggests such features.

Freeman discloses an electronic assembly system for use in parallel production lines. In the Freeman system, infeed conveyers load printed circuit boards into the machine, and outfeed conveyers discharge printed circuit boards out of the machine. These infeed and outfeed conveyers correspond to the claimed first and second transfers.

In addition, the Freeman system includes front and rear conveyors which can position printed circuit boards at work locations within a machine. These front and rear conveyors correspond to the claimed first and second conveyors.

Figures 6a-6d show a conveyor system 402 for conveying a first circuit board 420 into a first dispensing machine 400, while allowing a second circuit board to pass through the

dispensing machine 400 to a second dispensing machine positioned at a downstream point in the production line. This embodiment includes an infeed conveyor 410, and a front central conveyor 412 which moves in line with the infeed conveyor 410 to load the first circuit board 420, as shown in Figure 6b. Once the first circuit board 420 is loaded, the front central conveyor 412 is moved to a work position as shown in Figure 6c, and the back central conveyor 414 is moved in line with the infeed and outfeed conveyors, 410 and 416, respectively, to allow a second circuit board (not shown) to pass directly through the conveyor system 402 to a second dispensing machine located downstream (see column 8, lines 46-54 of Freeman).

When the work operation is complete on the first circuit board 420, the front central conveyor 412 is realigned with the infeed and outfeed conveyors 410 and 416 and moved out of the dispensing machine 400 while a third circuit board 424 is positioned at the infeed conveyor 410 awaiting conveyance into the dispensing machine 400, as shown in Figure 6d.

The conveyor system 402 disclosed by Freeman in Figures 6a-6d simply allows for a second printed circuit board to pass through the dispensing machine 400 to a downstream element of the production line while a dispensing operation is carried out on the first circuit board 420. Thus, a circuit board moving through Freeman's conveyor system 402 is only transported to a single work position within the dispensing machine. Freeman does not disclose or suggest that the front central conveyor 412 and/or the back central conveyor 414 are able to

pass a circuit board from one to the other for transport to different work positions within the dispensing machine.

Freeman further discloses in Figures 7a-7h two separate dispensing machines 500a and 500b disposed in series and coupled by two separate conveyor systems 502a and 502b in a production line. Although this system discloses multiple conveyors, these conveyors merely convey a first circuit board 520 to a work position within the first machine 500a, and then a second circuit board 522 through the first machine 500a to a work position in the second machine 500b. Again, these configurations lack the ability for a first conveyor within a single machine to transfer a circuit board to a second conveyor within the same machine so that the circuit board can be located at multiple work positions within a single machine.

Freeman also discloses in Figures 8a-8g conveyor system 702 provided within a dual zone dispensing system 700. The conveyor system 702 has infeed and outfeed conveyors 710 and 716, respectively, which would correspond to the claimed transfers. This system also has a front central conveyor 712, and a back central conveyor 714 which would correspond to the claimed conveyors. The functionality of the conveyor system 702 is similar to the conveyor system 402 discussed above, except that the front and back central conveyors 712 and 714 may be moved independently to dispensing locations 704 and 706, respectively. Even in this configuration, a circuit board cannot be passed from the front central conveyor 712 to the back central conveyor

714 after a dispensing operation has been completed at location 704. Here, again, it is impossible to pass circuit boards directly between two conveyors within a single machine.

Freeman does not disclose a system wherein printed circuit boards can be discharged from a first conveyor to a second conveyor, as recited in claim 1 (remembering that the infeed and outfeed conveyors of Freeman correspond to the claimed transfers, not the claimed conveyors). Accordingly, it is respectfully submitted that independent claim 1 is allowable over Freeman. Doyle is merely cited to teach conveyor guide frames, and thus fails to overcome the deficiencies of Freeman. Park is merely cited to teach a plurality of transfers, and thus fails to overcome the deficiencies of Freeman and Doyle. Accordingly, it is respectfully submitted that independent claim 1 is allowable over Freeman, Doyle and Park, either alone or in combination, and thus the rejection of independent claim 1 under 35 U.S.C. §103(a) over Freeman, Doyle and Park should be withdrawn. Dependent claims 2-9 are allowable at least for the reasons discussed above with respect to independent claim 1, from which they ultimately depend, as well as for their added features.

B. Claims 10-21

Independent claim 10 recites, a plurality of plane motion transfers configured to move in plane motion. As explained in the specification, such devices are capable of moving in both x and y directions under the control of a controller.

In addition, claim 10 recites a plurality of conveyors configured to move horizontally in a predetermined direction and to receive and carry printed circuit boards supplied from a plurality of plane motion transfers to a parts mounting work position. Claim 10 also recites that each conveyor is configured to discharge the printed circuit boards to another conveyor of the plurality of conveyors for transport to another parts mounting work position, and to discharge the printed circuit boards to the plurality of plane motion transfers when a parts mounting operation is complete.

Freedman lacks any element that could be considered plane motion transfers. In addition, as set forth above, Freeman does not teach or suggest that the front and back central conveyors in any of the disclosed embodiments allow for the exchange of circuit boards between the front and back central conveyors. For at least these reasons, it is respectfully submitted that independent claim 10 is allowable over Freeman. Further, as set forth above, Doyle fails to overcome the deficiencies of Freeman, and Park fails to overcome the deficiencies of Freeman and Doyle.

Accordingly, it is respectfully submitted that independent claim 10 is allowable over Freeman, Doyle and Park, either alone or in combination, and thus the rejection of independent claim 10 under 35 U.S.C. §103(a) over Freeman, Doyle and Park should be withdrawn. Rejected dependent claims 16-21 are allowable at least for the reasons discussed above with respect to independent claim 10, from which they ultimately depend, as well as for their added features.

C. Claims 22-24

Independent claim 22 recites, *inter alia*, carrying a first printed circuit board on a first conveyor and transferring the first printed circuit board from the first conveyor to a second conveyor . As set forth above, Freeman neither discloses nor suggests such features. More specifically, the assembly system taught by Freeman simply allows a circuit board to be passed from an infeed to one of the front or back central conveyors, and then from that conveyor to an outfeed. Note, the infeed and outfeed conveyors of Freeman correspond to the claimed transfers, not the claimed conveyors. Freeman does not disclose or suggest transferring a circuit board from the front to the back central conveyor. Further, as set forth above, Doyle fails to overcome the deficiencies of Freeman, and Park fails to overcome the deficiencies of Freeman and Doyle.

Accordingly, it is respectfully submitted that independent claim 22 is allowable over Freeman, Doyle and Park, either alone or in combination, and thus the rejection of independent claim 22 under 35 U.S.C. 103(a) over Freeman, Doyle and Park should be withdrawn. Rejected dependent claims 22-23 are allowable at least for the reasons discussed above with respect to independent claim 22, from which they depend, as well as for their added features.

D. Claim 25

Independent claim 25 recites, *inter alia*, supplying printed circuit boards loaded on a first plane motion transfer, which is configured to move in plane motion so as to align with a first conveyor and a second conveyor, to the first conveyor or the second conveyor. Independent claim 25 further recites discharging the printed circuit boards from the first conveyor or the second conveyor to a second plane motion transfer, which is configured to move in plane motion so as to align with the first conveyor and the second conveyor, when a parts mounting operation is complete. As set forth above, Freeman neither discloses nor suggests such features.

More specifically, circuit boards are fed into Freeman's system by a stationary infeed (elements 410, 510 and 710), and discharged from Freeman's system by a stationary outfeed (elements 416, 516 and 716). The infeed and outfeed of the Freeman system are not configured to move in plane motion so as to align with the front and back central conveyors. Further, as set forth above, Doyle fails to overcome the deficiencies of Freeman.

Still further, Park fails to overcome the deficiencies of Doyle and Freeman. More particularly, Doyle's system for conveying circuit boards includes an incoming member 40 for distributing a printed circuit board, and an outgoing member 60 for discharging a processed printed circuit board. Both the incoming member 40 and the outgoing member 60 include a pair of stationary rails and an adjustable rail which allows an operator to adjust an orientation of the incoming or outgoing member 40 or 60. However, the incoming and outgoing members 40 and

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60, once their respective adjustable rails are adjusted, remain stationary, and are not configured to move in plane motion.

Accordingly, it is respectfully submitted that independent claim 25 is allowable over Freeman, Doyle and Park, either alone or in combination, and thus the rejection of independent claim 25 under 35 U.S.C. 103(a) over Freeman, Doyle and Park should be withdrawn. Objected to dependent claims 26-29 are allowable at least for the reasons discussed above with respect to independent claim 25, from which they ultimately depend, as well as for their added features.

VI. CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney at the telephone number listed below.

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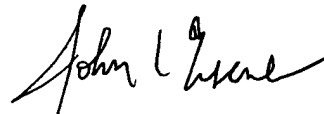
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To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
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Date: June 29, 2004

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